U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

5.4.1.1 PUMP FLYWHEEL INTEGRITY (PWR)

REVIEW RESPONSIBILITIES

Primary - ~~Materials Engineering Branch (MTEB)~~Materials and Chemical Engineering Branch (EMCB)[1]

Secondary - None

I. AREAS OF REVIEW

General Design Criterion 4~~ (Ref. 1)~~[2] requires that structures, systems, and components of nuclear power plants important to safety be protected against the effects of missiles that might result from equipment failures. Because flywheels have large masses and rotate at speeds of 900 rpm or 1200 rpm during normal reactor operation, a loss of flywheel integrity could result in high energy missiles and excessive vibration of the reactor coolant pump assembly. The safety consequences could be significant because of possible damage to the reactor coolant system, the containment, or the engineered safety features.

General Design Criterion 1~~ (Ref. 1)~~[3] and 10 CFR ~~Part 50,~~ 50.55a(a)(1)[4] require that structures, systems, and components important to safety shall be designed, fabricated, erected and tested to quality standards which shall be identified and evaluated to determine their adequacy to assure a quality product in keeping with the required safety function.

The following areas relating to reactor coolant pump flywheel integrity are reviewed by ~~MTEB~~EMCB[5]:

1. Materials Selection

   Reactor coolant pump flywheels are of a simple geometric shape, and are made of ductile material. Their quality can be closely controlled and their service conditions are not severe; therefore, the use of suitable material, coupled with adequate design and inservice inspection can provide a sufficiently small probability of a flywheel failure that the consequences of failure need not be protected against.

   Information in the applicant's safety analysis report (SAR) on materials selection and the procedures used to minimize flaws and improve mechanical properties is reviewed to establish that sufficient information is provided to permit an evaluation of the adequacy of the flywheel materials.

2. Fracture Toughness

   The fracture toughness of the materials, including materials tests, correlation of Charpy specimens to fracture toughness parameters, or the alternate use of a nil-ductility transition reference temperature (RT_{NDT}), are reviewed to establish that the flywheel materials will exhibit adequate fracture toughness at normal operating temperature ~~(Ref. 2)~~[6].

3. Preservice Inspection

   The descriptive information is reviewed to verify that the bore of the flywheel is machined to final dimensions if it is flame cut, and that ultrasonic and surface inspections are performed on all finished machined surfaces.

4. Flywheel Design

   The flywheel design information including allowable stresses, design overspeed considerations, and shaft and bearing design adequacy, is reviewed.

5. Overspeed Test

   The applicant's overspeed test procedures are reviewed to establish their adequacy.

6. Inservice Inspection

   A description of the preservice and postoperational phases of the inservice inspection program, including types of inspections, areas inspected, frequencies of inspection, and flaw acceptance criteria, is reviewed.

Review Interfaces:[7]

In addition, the EMCB will coordinate another branch's evaluation that interfaces with the overall review of the system as follows:[8]

The review for quality assurance is coordinated and performed by the Quality Assurance and Maintenance Branch ~~(QAB)~~(HQMB)[9] as part of its primary review responsibility for Standard Review Plan ~~Sections 17.1 and 17.2~~Chapter 17[10]. The acceptance criteria necessary for the review and the methods of application are contained in individual sections of the referenced SRP ~~section~~Chapter[11].

II. ACCEPTANCE CRITERIA

The ~~MTEB~~EMCB[12] acceptance criteria are based on meeting the relevant requirements of the following regulations:

A. General Design Criterion 1 and 10 CFR Part 50, §50.55a(a)(1), as they relate to pump flywheel design, materials selection, fracture toughness, preservice and inservice inspection programs, and overspeed test procedures to determine their adequacy to assure a quality product commensurate with the importance of the safety function to be performed.

B. General Design Criterion 4, as it relates to protecting safety-related structures, systems, and components of nuclear power plants from the effects of missiles that might result from reactor coolant pump failure. ~~The following regulatory guide provides positions acceptable to the staff in meeting the requirements listed above: Regulatory Guide 1.14 which describes a method of minimizing the potential for failures of the flywheels of reactor coolant pump motors in light-water-cooled power reactors.~~[13]

Specific criteria necessary to meet the relevant requirements of GDC 1 and 4 and 10 CFR ~~Part 50,~~ 50.55a(a)(1)[14] are as follows:

1. Materials Selection

   The applicant's selection of flywheel material is acceptable if it is in accordance with the following criteria:

   The flywheel material must be produced by a process (such as vacuum melting or degassing) that minimizes flaws in the material and improves its fracture toughness properties. The material must be examined and tested to meet the following criteria:

   a. The nil-ductility transition (NDT) temperature of the flywheel material, as obtained from dropweight tests (DWT) performed in accordance with the specification ASTM E-208 (Reference~~.~~[15] ~~3~~[16]), should be no higher than -12.5°C (10°F)[17].

b. The Charpy V-notch (C_v) upper-shelf energy level in the "weak" direction (WR orientation in plates) of the flywheel material should be at least 68 N·m (50 ft-lbs)[18]. A minimum of three C_v specimens should be tested from each plate or forging, in accordance with ASTM A-370 (Reference.[19] ~~4~~[20]).

2. Fracture Toughness

The following fracture toughness criteria are derived from Regulatory Guide 1.14, C.1.c, and the ASME Boiler and Pressure Vessel Code (hereafter "the Code"), Section III, Appendix G, Protection Against Nonductile Failure[21] (Reference 4)[22]. The pump flywheel fracture toughness properties are acceptable if they are in compliance with the following criteria:

The minimum static fracture toughness of the material at the normal operating temperature of the flywheel should be equivalent to a reference stress intensity factor (K_{Ir}) ~~critical stress intensity factor, K_{Ic},~~[23] of at least 165 MPa √m (150 ksi √in)[24]. Compliance can be demonstrated by either of the following:

a. Testing of the actual material to establish the ~~K_{Ic}~~ K_{Ir}[25] value at the normal operating temperature.

b. Determining that the normal operating temperature is at least 56°C (100°F)[26] above the RT_{NDT}.

3. Preservice Inspection

The following preservice inspection criteria are derived from Regulatory Guide 1.14, ~~C.1.d, C.1.e, and C.1.f~~C.4.a.[27] The applicant's preservice inspection program including finish machining and ultrasonic and surface inspections is acceptable if in compliance with the following criteria:

a. Each finished flywheel should be subjected to a 100% volumetric examination by ultrasonic methods using procedures and acceptance criteria specified in Code Section III, NB-2530 for plates, and NB-2540 for forgings.

b. If the flywheel is flame cut from a plate or forging, at least 1.3 cm (1/2 inch)[28] of material should be left on the outer and bore radii for machining to final dimensions.

c. Finish machined bores, keyways, splines, and drilled holes should be subjected to magnetic particle or liquid penetrant examination.

4. Flywheel Design

The following flywheel design criteria are derived from Regulatory Guide 1.14, C.2. The applicant's flywheel design is acceptable if in compliance with the following criteria:

The flywheel should be designed to withstand normal conditions, anticipated transients, the design basis loss of coolant accident, and the safe shutdown earthquake without loss of structural integrity.

The design of the pump flywheel should meet the following criteria:

a. The combined stresses at the normal operating speed due to centrifugal forces and the interference fit of the wheel on the shaft, should not exceed 1/3 of the minimum specified yield strength or 1/3 of the measured yield strength in the weak direction of the material if appropriate tensile tests have been performed on the actual material of the flywheel.

b. The design overspeed of a flywheel should be at least 10% above the highest anticipated overspeed. The anticipated overspeed should include consideration of the maximum rotational speed of the flywheel if a break occurs in the reactor coolant piping in either the suction or discharge side of the pump. ~~The~~An acceptable basis for the assumed design overspeed, addressing pipe breaks consistent with the design basis for reactor coolant piping, should be submitted to the staff for review.[29]

c. The combined stresses at the design overspeed, due to centrifugal forces and the interference fit, should not exceed 2/3 of the minimum specified yield strength, or 2/3 of the measured yield strength in the weak direction if appropriate tensile tests have been performed on the actual material of the flywheel.

d. The shaft and the bearings supporting the flywheel should be able to withstand any combination of loads from normal operation, anticipated transients, the design basis ~~of~~[30] loss-of-coolant accident, and the safe shutdown earthquake.

5. Overspeed Test

The following overspeed test criterion is taken from the Regulatory Guide 1.14, C.3. The applicant's commitment to perform an overspeed test is acceptable if each flywheel assembly is to be tested at the design overspeed of the flywheel.

6. Inservice Inspection (ISI)

The following inservice inspection program criteria are derived from Regulatory Guide 1.14, C.4.b.[31] The applicant's ISI program is acceptable if in compliance with the following:

a. A volumetric examination by ultrasonic methods of the areas of higher stress concentration at the bore and keyway at approximately 3-1/3 ~~years~~operating year[32] intervals, during the refueling or maintenance shutdown coinciding with the inservice inspection schedule as required by the Code, Section XI. Removal of the flywheel is not required.

b. A surface examination by liquid penetrant or magnetic particle methods of all exposed surfaces, and 100% volumetric examination by ultrasonic methods at approximately ten-year intervals, during the plant shutdown coinciding with the inservice inspection schedule as required by the Code, Section XI. Removal of the flywheel is not required.

c. A preservice baseline inspection incorporating all the procedures of a. and b. above, which should establish initial flywheel conditions, accessibility, and practicality of the program.

d. Examination procedures and acceptance criteria should be in conformance with the requirements specified in subsection II.3.a of this SRP Section.

Technical Rationale:[33]

The technical rationale for application of the above acceptance criteria to the reactor coolant pump flywheel is discussed in the following paragraphs:

1. GDC 1 and 10 CFR 50.55a require that systems and components be designed, fabricated, erected, constructed, tested, and inspected to quality standards commensurate with the importance of the safety function to be performed. 10 CFR 50.55a also incorporates by reference the applicable editions and addenda of the ASME Boiler and Pressure Vessel Code. Reactor Coolant Pump flywheel failure can result in reduction or loss of forced coolant flow and the effects of resulting missiles could possibly damage the reactor coolant system, the containment, or engineered safety features which provide functions of considerable importance to safety. Application of 10 CFR 50.55a and GDC 1 provides assurance that established standard practices of proven or demonstrated effectiveness are used to assure that failure of the flywheel will not occur, thereby precluding the effects of such a failure commensurate with its importance to safety.

2. GDC 4 requires structures, systems, and components important to safety be protected against the effects of missiles that might result from equipment failures. Regulatory Guide 1.14 describes methods to minimizing the potential for failures of the reactor coolant pump flywheels. During operation at normal speed, a flywheel has sufficient kinetic energy to potentially produce high-energy missiles and excessive vibration of the reactor coolant pump assembly if the flywheel should fail. Overspeed of the pump rotor assembly during a transient increases both the potential for failure and the kinetic energy of the flywheel. The safety consequences of flywheel failure could be significant because of possible damage to the reactor coolant system, the containment, or the engineered safety features. Application of this criteria ensures that there will be an extremely low probability of missiles from the flywheels resulting in consequences to the reactor coolant system pressure boundary, containment, and engineered safety features.

III. REVIEW PROCEDURES

The reviewer will select and emphasize material from the procedures described below, as may be appropriate for a particular case.

For each area of review, the following review procedure is followed:

1. Materials Selection

The materials selection, including the procedures to minimize flaws and improve mechanical properties described by the applicant, are reviewed and compared with the requirements of subsection II.1 of this SRP Section. If it is a new material not used in prior licensing cases, the materials selection is reviewed and evaluated to establish its acceptability. Based on past evaluations, the following materials are suitable for pump flywheels provided that they meet all the criteria listed in subsection II.1 and II.2 of this SRP section: ASME SA-533-B Class 1, ASME SA-508 Class 2, ASME SA-508 Class 3,[34] and ASME SA-516 Grade 65~~ (Ref 2)~~[35]. These material specifications are listed in the Code, Section II.[36]

2. Fracture Toughness

The fracture toughness properties of the flywheel materials, including test data where applicable, are reviewed and compared with the requirements of subsection II.2 of this SRP section. Two alternative methods for deriving the fracture toughness of the flywheel materials are acceptable. 1)[37] The value of the critical or reference[38] stress intensity factor is based on fracture mechanics testing.~~, while the~~ 2) The[39] use of the reference temperature approach is based on the stated normal operating temperature of the flywheel and the actual reference nil-ductility transition temperature of the materials~~,~~ ~~if~~for[40] an operating license review, or ~~as~~is based on values[41] specified in the appropriate SAR[42]~~, if~~for[43] a construction permit or design certification[44] review.

3. Preservice Inspection

The preservice inspection program, including finish machining, and ultrasonic and surface inspections described by the applicant is reviewed and compared with the requirements of subsection II.3 of this SRP section. The extent to which the ultrasonic inspections proposed and the acceptance criteria in the SAR agree with Code Section III, NB-2530 for plate materials or NB-2540 for forgings, are reviewed.

4. Flywheel Design

The design and stress analysis procedures used for the flywheel are reviewed, including the following areas:

a. Load combinations at normal operating speed and allowable stresses.

b. Design overspeed and basis for selection of design overspeed.

c. Load combinations or design overspeed and allowable stresses.

d. Shaft and bearing load combinations.

The information given in the SAR is compared and evaluated against subsection II.4 of this SRP section.

5. Overspeed Test

The applicant should confirm that an overspeed test will be run in compliance with subsection II.5 of this SRP section.

6. Inservice Inspection

The inservice inspection program described by the applicant in the plant technical specifications, including areas to be inspected, methods of inspection, frequency of inspection, and acceptance criteria, is reviewed and compared with the requirements of subsection II.6 of this SRP section.

For standard design certification reviews under 10 CFR Part 52, the procedures above should be followed, as modified by the procedures in SRP Section 14.3 (proposed), to verify that the design set forth in the standard safety analysis report, including inspections, tests, analysis, and acceptance criteria (ITAAC), site interface requirements and combined license action items, meet the acceptance criteria given in subsection II. SRP Section 14.3 (proposed) contains procedures for the review of certified design material (CDM) for the standard design, including the site parameters, interface criteria, and ITAAC.[45]

IV. EVALUATION FINDINGS

The reviewer verifies that sufficient information has been provided in accordance with the requirements of this SRP section, and that his evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

The staff concludes that the precautions taken to assure the integrity of the reactor coolant pump flywheels are acceptable and meet the requirements of General Design Criteria 1 and 4 and 10 CFR ~~Part 50,~~ 50.55a(a)(1)[46]. This conclusion is based on the following:

1. The applicant's selection of materials, fracture toughness tests, design procedures, preservice overspeed spin testing program, and inservice inspection program for the reactor coolant pump flywheels have been reviewed and found to meet the requirements for GDC 1 and 10 CFR Part 50, 50.55a(a)(1) with respect to providing adequate assurance of a quality product commensurate with the importance of the safety function.

2. The applicant has met the requirements of GDC 4,[47] complying with the guidance of Regulatory Guide 1.14 in using suitable materials with adequate fracture toughness~~,~~ and conservative design procedures, and by providing a preservice testing~~,~~ and inservice inspection program for flywheels of reactor coolant pump motors which provide~~s~~

reasonable assurance of the structural integrity of the flywheels in the event of design overspeed transients ~~or~~ or[48] postulated accidents.

For design certification reviews, the findings will also summarize, to the extent that the review is not discussed in other safety evaluation report sections, the staff's evaluation of inspections, tests, analysis, and acceptance criteria (ITAAC), including design acceptance criteria (DAC), site interface requirements, and combined license action items that are relevant to this SRP section.[49]

V. IMPLEMENTATION

The following is intended to provide guidance to applicants and licensees regarding the NRC staff's plans for using this SRP section.

This SRP section will be used by the staff when performing safety evaluations of license applications submitted by applicants pursuant to 10 CFR 50 or 10 CFR 52.[50] Except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein will be used by the staff in its evaluation of conformance with Commission regulations.

The provisions of this SRP section apply to reviews of applications docketed six months or more after the date of issuance of this SRP section.[51]

Implementation schedules for conformance to parts of the method discussed herein are contained in the referenced regulatory guide.

VI. REFERENCES

1. 10 CFR Part 50, §50.55a, "Codes and Standards," paragraph (a)(1).[52]

~~1~~2.[53] 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," (General Design Criterion 1, "Quality Standards and Records," General Design Criterion 4, "Environmental and ~~Missile~~ Dynamic[54] Design Bases)."

~~5~~3. Regulatory Guide 1.14, "Reactor Coolant Pump Flywheel Integrity." ~~(originally Safety Guide 14).~~[55]

~~2~~4. ASME Boiler and Pressure Vessel Code, Sections II, III, and XI, American Society of Mechanical Engineers.

~~3~~5. ASTM E-208-69[56], "Standard Method for Conducting Drop-Weight Tests to Determine Nil-Ductility Transition Temperature of Ferritic Steels," Annual Book of ASTM Standards, Part 31, American Society for Testing and Materials.

~~4~~6. ASTM A-370-72[57], "Methods and Definitions for Mechanical Testing of Steel Products," Annual Book of ASTM Standards, Part 31, American Society for Testing and Materials.

[This Page Intentionally Left Blank]

SRP Draft Section 5.4.1.1
Attachment A - Proposed Changes in Order of Occurrence

Item numbers in the following table correspond to superscript numbers in the redline/strikeout copy of the draft SRP section.

Item	Source	Description
1.	Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP Section 5.4.1.1.
2.	SRP-UDP format item.	The SRP-UDP format specifies that GDCs do not need parenthetical relation to the References subsection in their citations.
3.	SRP-UDP format item.	The SRP-UDP format specifies that GDCs do not need parenthetical relation to the References subsection in their citations.
4.	SRP-UDP format item	Revised citation to meet SRP-UDP format guidance for CFR citations.
5.	Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP Section 5.4.1.1.
6.	SRP-UDP format item.	The SRP-UDP format is to provide parenthetical relation only to citations of documents listed in the References subsection.
7.	SRP-UDP format item, Reformat Areas of Review	Added "Review Interfaces" heading to Areas of Review.
8.	Editorial	Added an introductory sentence for the reviews by other branches where the interface is coordinated by the EMCB. This Review Interface format is consistent with the format presented by the SRP-UDP procedures.
9.	Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP Sections 17.1 and 17.2.
10.	Editorial	Revised to provide a more general reference to Chapter 17 which also includes Sections 17.3 and 17.4 which may be relevant to the overall review.
11.	Editorial	Added an s to make section plural since it is referring to two sections.
12.	Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP Section 5.4.1.1 .
13.	Editorial	Guidance which implement requirements are listed under Specific Criteria; Relevant positions from Regulatory Guide 1.14 are cited in specific criteria and review procedures.
14.	SRP-UDP format item.	Revised citation to meet SRP-UDP format guidance for CFR citations.
15.	SRP-UDP format item.	The SRP-UDP format is to spell out the word Reference in citations.

Item	Source	Description
16.	SRP-UDP format item.	Change reference number to match reordering of references to comply with the updated format.
17.	NRC Metrication Policy	Added the SI equivalent of the 10 deg F and reformatted to be consistent with the NRC Metrication policy.
18.	NRC Metrication Policy	Added the SI equivalent for ft-lbs and reformatted to be consistent with the NRC Metrication policy.
19.	SRP-UDP format item.	The SRP-UDP format is to spell out the word Reference in citations.
20.	SRP-UDP format item.	Change reference number to match reordering of references to comply with the updated format.
21.	Editorial	Added title to clarify the reference citation.
22.	SRP-UDP format item.	Added parenthetical reference citation to comply with the updated format.
23.	**Integrated Impact 330**	Revised the terminology describing fracture toughness to be consistent with current designations used in ASME code, section III, Appendix G. The changes also reflect incorporation of PRB comments to clarify that the reference stress intensity factor is not the same as (not interchangeable with) the critical stress intensity factor (see Memorandum to R.W. Borchart from R. Hermann dated September 22, 1995).
24.	NRC Metrication Policy	Added the SI equivalent of the fracture toughness ksi √in and reformatted to be consistent with the NRC Metrication policy.
25.	**Integrated Impact 330**	Revised the terminology for fracture toughness to be consistent with current designations used in ASME code, section III, Appendix G.
26.	NRC Metrication Policy	Added the SI equivalent of a ΔT of 100 deg F and reformatted to be consistent with the NRC Metrication policy.
27.	Reference Verification	The latest revision of Regulatory Guide 1.14 specifies preservice inspection in subsection C.4.a.
28.	NRC Metrication Policy	Added the SI equivalent for inch and reformatted to be consistent with the NRC Metrication policy.

Item	Source	Description
29.	**Integrated Impact 327**, Editorial	Revised so that this statement provides design overspeed determination criteria rather than simply requesting information. Also revised to clarify the existing criteria addressing reactor coolant piping breaks to reflect that breaks should be assumed consistent with the design basis for reactor coolant piping, so that pipe breaks need not be considered in any piping that has been acceptably analyzed to leak-before-break. This change incorporates PRB comments reflected in the September 21, 1995 Memorandum to R.W. Borchart from R. Hermann.
30.	Editorial	Removed extra word.
31.	Reference Verification	The latest version of Regulatory Guide 1.14 specifies inservice inspection in subsection C.4.b.
32.	Incorporation of PRB Comment	Added clarification regarding operating vs calendar years at the request of the PRB (see Memorandum to R.W. Borchart from R Hermann dated September 21, 1995).
33.	SRP-UDP format item, develop Technical Rationales.	Technical Rationale were developed and added for the Acceptance Criteria, GDC 1 and 10 CFR 50, §50.55a(a)(1) and GDC 4. Technical Rationale is a new SRP-UDP format item.
34.	**Integrated Impact 881**	Revised list of materials suitable for fabrication of reactor coolant pump flywheels to include an additional grade of material.
35.	SRP-UDP format item.	Only the first citation of a reference will have a parenthetical notation.
36.	Editorial	Add information on the location of the material specifications listed in this paragraph.
37.	Editorial	Revised to incorporate PRB comment regarding grammar/structure (see Memorandum to R.W. Borchart from R. Hermann dated September 22, 1995).
38.	**Integrated Impact 330**	Revised the terminology for fracture toughness to be consistent with current designations used in ASME code, section III, Appendix G.
39.	Editorial	Revised to incorporate PRB comment regarding grammar/structure (see Memorandum to R.W. Borchart from R. Hermann dated September 22, 1995).
40.	Editorial	Revised to incorporate PRB comment regarding grammar/structure (see Memorandum to R.W. Borchart from R. Hermann dated September 22, 1995).

Item	Source	Description
41.	Editorial	Revised to incorporate PRB comment regarding grammar/structure (see Memorandum to R.W. Borchart from R. Hermann dated September 22, 1995).
42.	Editorial	Added clarification of where fracture toughness is specified.
43.	Editorial	Revised to incorporate PRB comment regarding grammar/structure (see Memorandum to R.W. Borchart from R. Hermann dated September 22, 1995).
44.	SRP-UDP format item.	Added review of design certification to comply with the SRP-UDP format.
45.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard paragraph to address application of Review Procedures in design certification reviews.
46.	SRP-UDP format item.	Revised citation to meet SRP-UDP format guidance for CFR citations.
47.	Editorial	Improved grammar and punctuation for ease of understanding.
48.	Editorial	Corrected grammar.
49.	SRP-UDP format item, editorial changes to implement the 10 CFR 52 process.	Added a general description of additional items that should be discussed in the Evaluation Findings for the design certification reviews.
50.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard sentence to address application of the SRP section to reviews of applications filed under 10 CFR Part 52, as well as Part 50.
51.	SRP-UDP Guidance	Added standard paragraph to indicate applicability of this section to reviews of future applications.
52.	SRP-UDP format item.	Publications cited in the body of the SRP Section are to be listed in the References subsection,.
53.	SRP-UDP format item.	Reordered references to comply with the SRP-UDP format.
54.	Potential Impact 21747	The title of 10 CFR Part 50, Appendix A, GDC 4 was revised.
55.	Editorial	Delete obsolete information that does not add the to meaning of the reference.
56.	**Integrated Impact 328**	Consideration should be given to updating the citation of ASTM E-208-69 pending the review and approval of the associated standard comparison.

Item	Source	Description
57.	**Integrated Impact 329**	Consideration should be given to updating the citation of ASTM A-370-72 pending the review and approval of the associated standard comparison.

[This Page Intentionally Left Blank]

Integrated Impact No.	Issue	SRP Subsections Affected
327	Revise the Acceptance Criteria to address the revision to GDC 4 as it relates to the application of "leak-before-break" methods when determining the overspeed limits in the design of the RCP flywheel.	II Acceptance Criteria, 4.b add criteria permitting consideration of piping design basis in determining RCP design overspeed, as was permitted for the CE System 80+ design which included acceptable leak before break analyses.
328	Placeholder Integrated Impact. Consider replacing citation of ASTM E-208-1969 with the latest version, ASTM E-208-1991.	This Integrated Impact has not been processed. Subsections II and VI would be impacted if implemented.
329	Placeholder Integrated Impact. Consider replacing citation of ASTM A-370-1972 with the latest version, ASTM A-370-1992.	This Integrated Impact has not been processed. Subsections II and VI would be impacted if implemented.
330	This is a minor editorial change to the terminology used to describe the fracture toughness properties. The 1989 edition of ASME code, section III now identifies the former critical stress intensity factor K_{Ic} as the critical or reference stress intensity factor K_{Ir}. K_{Ir}, being K_{Ic} plus a standard deviation, is thus more conservative than K_{Ic}.	II ACCEPTANCE CRITERIA under heading 2. Fracture Toughness, change "critical stress intensity factor" to "reference stress intensity factor" and change K_{Ic} to K_{Ir}. III REVIEW PROCEDURES under heading 2. Fracture Toughness, change "critical stress intensity factor" to "critical or reference stress intensity factor."
721	Placeholder Integrated Impact. Consider revising RG 1.14 to incorporate the results of the comparison with the latest version of this standard, ASTM A20-1993.	This Integrated Impact has not been processed since it concerns recommended revision of RG 1.14.
881	Revise Review Procedures materials suitable for fabrication of reactor coolant pump flywheels to include an additional grade of material.	III REVIEW PROCEDURES under heading 1. Material Selection, added to the last sentence of the first paragraph the specification ASME SA-508 Class 3.